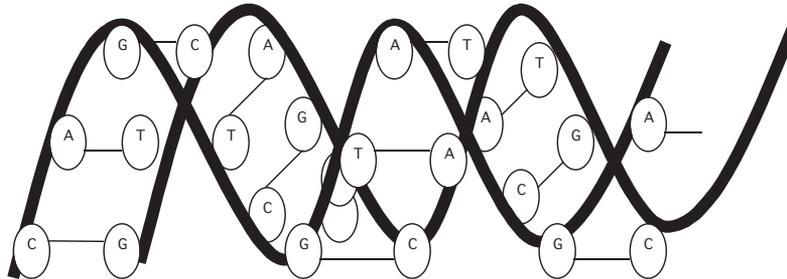


**TEKS 2.B.6.A****Biology****STANDARD PRACTICE**

- 1 Which of the following statements best describes the structure of DNA?
- A Two strands of proteins are held together by sugar molecules, nitrogen bases, and phosphate groups.
  - B Two strands composed of sugar molecules and phosphate groups are linked together by proteins.
  - C Nitrogen bases and phosphate groups link together to form the backbone of a strand. Two such strands are linked together by sugar molecules.
  - D Sugar molecules and phosphate groups link together to form the backbone of a strand. Two such strands are linked together by matched nitrogen bases.



- 2 The diagram represents an incomplete model of the DNA molecule. Even though the model is not complete, what pattern is evident in this representation of the DNA molecule?
- A Every third base pair has a mutation.
  - B Guanine is always paired with cytosine.
  - C The model has a repeating base sequence.
  - D There are two sugars between each phosphate.
- 3 When a cell divides to form new cells, which of the following is responsible for carrying the genetic material of parent cells to the new cells?
- A The cytoplasm
  - B The DNA
  - C The endoplasmic reticulum
  - D The Golgi apparatus

**TEKS 2.B.6.B****Biology****STANDARD PRACTICE**

- 1 The genetic code is nearly universal. That is, with few exceptions, the same codons code for the same amino acids in all organisms. What does the near universality of the genetic code suggest?
  - A All life forms can reproduce with one another.
  - B All life forms have the same number of genes.
  - C All life forms have a common evolutionary ancestor.
  - D All life forms arose about the same time in Earth's history.
  
- 2 There are 64 possible mRNA codons that make up the genetic code. Which of the following is true of the genetic code?
  - A Codons can be only three amino acids long.
  - B Codons can be one, two, or three bases long.
  - C Each codon is linked to only one amino acid.
  - D Each amino acid is linked to only one codon.
  
- 3 A recent study of the genetic code has determined that the mRNA codons UCU, UCC, UCA, and UCG all code for the amino acid serine. What does this research finding suggest?
  - A The genetic code is the same for nearly all organisms.
  - B The genetic code does not dictate the amino acid sequence of proteins.
  - C A mutation in one base will always have a physical effect on the resulting protein.
  - D A mutation in one base could have absolutely no physical effect on the resulting protein.

**TEKS 2.B.6.C**

**Biology**

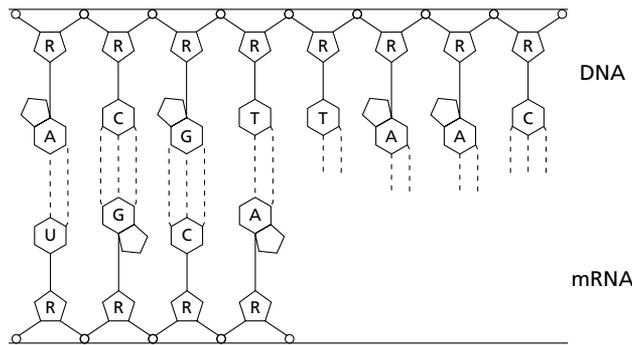
**STANDARD PRACTICE**

- 1 During the process of transcription, the strand of messenger RNA shown below is produced.

mRNA      AACUUAGGACAU

What was the original DNA template that produced this strand?

- A TTCTTAGGACAT
- B UUGTTUCCUGUT
- C UUGAAUCCUGUA
- D TTGAATCCTGTA



- 2 The diagram above shows one process that occurs during gene expression. What process does the diagram represent?
- A DNA replication
  - B RNA replication
  - C Transcription
  - D Translation
- 3 Which of the following statements best describes the process of gene expression?
- A Messenger, transfer, and ribosomal RNA transcribe information onto a cell's DNA.
  - B The information in DNA is transcribed to RNA and then transcribed to amino acids.
  - C The information in DNA is transcribed to RNA and then translated to make specific proteins.
  - D The information in DNA is translated by messenger RNA and then translated to make ribosomal RNA.

**TEKS 2.B.6.D****Biology****STANDARD PRACTICE**

- 1 In some cells, gene expression involves mRNA processing. Which of the following best describes where mRNA processing is likely to occur?
  - A nucleus of prokaryotic cell
  - B cytoplasm of prokaryotic cell
  - C nucleus of eukaryotic cell
  - D ribosome of eukaryotic cell
  
- 2 In prokaryotes, when is gene expression regulated?
  - A at the start of DNA replication
  - B at the end of DNA replication
  - C at the start of translation
  - D at the start of transcription
  
- 3 One step of the gene regulation process often involves a DNA segment that allows a gene to be transcribed. What is this DNA segment called?
  - A Operator
  - B Promoter
  - C Operon
  - D Exon
  
- 4 What does gene expression control?
  - A the proteins that are made by the cell
  - B the rate at which DNA replication occurs
  - C the duration between cell cycles
  - D the division of the cell nucleus

**TEKS 2.B.6.E****Biology****STANDARD PRACTICE**

- 1 Errors sometimes happen during DNA replication. If guanine is accidentally substituted for thymine in a DNA nucleotide, which of the following will always happen because of the error in DNA replication?
  - A The cell will die when it divides.
  - B The cell will become a rapidly dividing cancer cell.
  - C The cell will produce mRNA with a mutated nucleotide sequence.
  - D The cell will have a better chance of surviving under different conditions.
  
- 2 Mutations can occur during mitosis, which produces body cells, and meiosis, which produces gametes. Which of the following statements about mutations is true?
  - A Mutations in the DNA of body cells cannot affect the individual in which they happen.
  - B A mutation in the DNA of a body cell can cause the function of future cells to change.
  - C A mutation in the DNA of a gamete affects the body cells of the individual that produced the gamete.
  - D Mutations during mitosis are limited to inversion mutations.
  
- 3 Most mutations involve a misplacement of a nucleotide on a DNA segment. Which of the following is not a possible result of a mutation?
  - A The mutation will be passed on to the next generation.
  - B The mutation will cause immediate death of the individual.
  - C The gene that contains the mutation will be expressed in a new way.
  - D The gene that contains the mutation will be expressed in the same way as before the mutation.

**TEKS 2.B.6.F****Biology****STANDARD PRACTICE**

- 1 A gardener crossed a plant with red flowers with a plant that had white flowers. The offspring plants had pink flowers. What is the most likely genetic reason for these differences in color?
  - A Codominance
  - B Recessive pink genes
  - C Polygenic inheritance
  - D Incomplete dominance
  
- 2 Gregor Mendel crossed a true-breeding tall plant ( $TT$ ) with a true-breeding short plant ( $tt$ ). What are the possible phenotypes for the offspring?
  - A All tall
  - B All short
  - C Ratio of 1 tall : 1 short
  - D Ratio of 2 tall : 1 short
  
- 3 A population of crabs living on a sandy beach exhibits three colors: dark brown, light brown, and speckled. The genotypes for these colors are  $BB$  for dark brown,  $bb$  for light brown, and  $Bb$  for speckled. If a dark brown crab were crossed with a light brown crab, what would be the probable phenotypic ratio of their offspring?
  - A All speckled
  - B All dark brown
  - C 3 dark brown : 1 light brown
  - D 1 dark brown : 2 speckled : 1 light brown
  
- 4 In snap peas, yellow flowers ( $Y$ ) are dominant to white flowers ( $y$ ). In the cross  $YY \times Yy$ , what would be the genotypic ratio of the F1 generation?
  - A 1:1
  - B 1:2
  - C 1:3
  - D 3:1

**TEKS 2.B.6.G****Biology****STANDARD PRACTICE**

- 1 Which of these statements best explains why meiosis is important for sexual reproduction?
  - A By involving two cell divisions, meiosis ensures that offspring receive half their genetic information from each parent.
  - B By involving a single cell division, meiosis ensures that offspring are genetically identical to each other and to the parents.
  - C Meiosis occurs in those cells that have already undergone DNA replication.
  - D During meiosis, sister chromatids, which are genetically different from each other, line up along the center of the cell, and then separate into two cells.
  
- 2 During meiosis, homologous chromosomes line up next to each other. If one arm of a chromatid crosses over the arm of another chromatid, what results?
  - A The creation of an additional sex cell
  - B The independent assortment of genetic material
  - C A possible change in the offspring cell's functionality
  - D Additional variation in the DNA combination of each sex cell formed
  
- 3 Which statement explains why approximately half of an individual's DNA sequence comes from each parent?
  - A A cell from one parent undergoes meiosis, producing offspring cells that have both parents' DNA.
  - B A cell from one parent undergoes mitotic cell division, producing offspring cells that have only half of that parent's DNA.
  - C Cells in the parents undergo meiosis, producing haploid gametes that meet up during fertilization to produce a diploid individual.
  - D Cells in the parents undergo mitosis, producing offspring cells that meet up during fertilization to produce an individual with half of each parent's DNA.

**TEKS 2.B.6.H****Biology****STANDARD PRACTICE**

- 1 The development of recombinant DNA technology was a major step forward in genetic science. Which of the following developments represents an advance in medicine that the application of genetic science allowed?
  - A development of genetic counseling as a career
  - B development of a method of DNA fingerprinting
  - C production of proteins, such as insulin, for use as drugs
  - D cloning of animals and engineering of agricultural crops
  
- 2 How do scientists use karyotypes to study an organism's genome?
  - A Scientists analyze distinct banding patterns on entire chromosomes.
  - B Scientists analyze DNA restriction fragments separated by gel electrophoresis.
  - C Scientists isolate genes from one species and incorporate them into the genome of another species.
  - D Scientists use DNA polymerase and tagged nucleotide bases to make multiple DNA strands of varying lengths.
  
- 3 When Darwin first proposed his theory of evolution by natural selection, the field of genetics did not yet exist. In what way does genetic science now contribute to the study of evolution?
  - A Scientists can create organisms that were extinct using DNA from fossils and better understand how they evolved.
  - B Scientists can use genetic engineering to carry out the process of evolution over just months instead of millions of years.
  - C Scientists can compare the DNA from fossils in rock to determine evolutionary relationships among extinct species.
  - D Scientists can determine evolutionary relationships among living species by comparing amino acid and DNA sequences.